

Sustainable Water Purification, Phase I

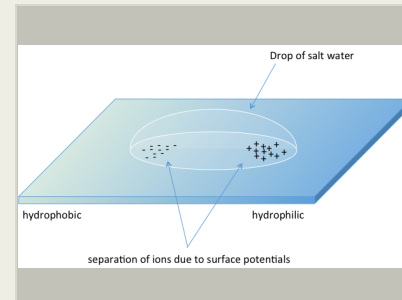
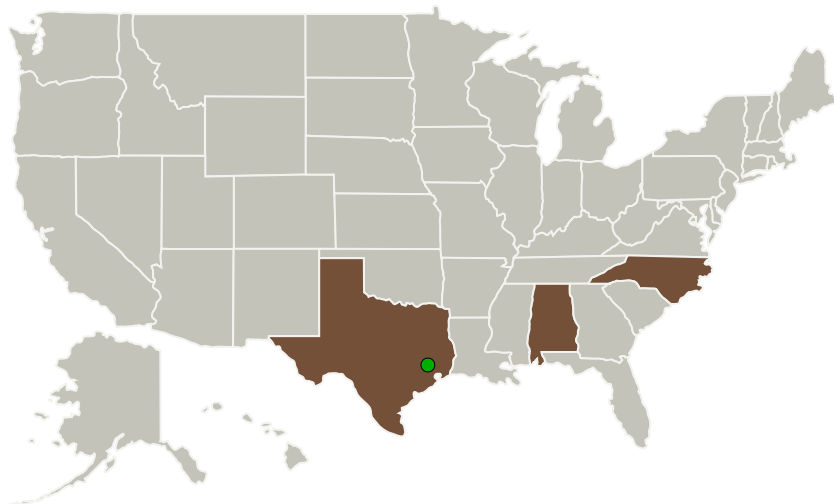
Completed Technology Project (2016 - 2017)



Project Introduction

Newly developed phase-engineered and low dimensional materials have opened the door to the design of materials structures that exhibit extremely efficient ionic transport. Recently, a new type of electro-filtration system designed to convert thermal power into purified water from salt water (or other ionic pollutants) has been demonstrated in the lab. The system is based on a bi-phasic nanoplatelette form of the compound MoS₂ (Molybdenum disulphide). Specifically engineering a single film of hexagonal MoS₂ that transitions into tetragonal MoS₂, one of which is hydrophobic and one strongly hydrophilic, liquids such as water can be moved through the film. When this film is placed in a thermal gradient, a thermoelectric voltage is established that can be used to thereby remove ions within the water as it exits the material system. So the entire system is powered through the Seebeck effect and for small samples this has been shown. In this program we will attempt to demonstrate a scaleup of the concept using a small canister the size of a writing pen. When one end is dipped into the water the thermal gradient between that end and the one in air, caused by differences in the convectivity, will power the exchange of ions and purify the water for drinking. Streamline Automation will work in collaboration with its academic partners at Wake Forest University on this project.

Primary U.S. Work Locations and Key Partners



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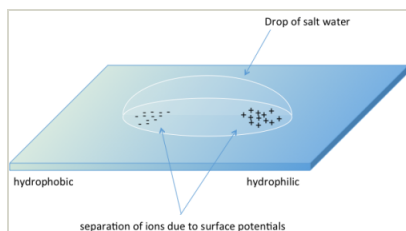


Organizations Performing Work	Role	Type	Location
Streamline Automation, LLC	Lead Organization	Industry	Huntsville, Alabama
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
Wake Forest University	Supporting Organization	Academia	Winston-Salem, North Carolina

Primary U.S. Work Locations

Alabama	North Carolina
Texas	

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/134359>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Streamline Automation, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

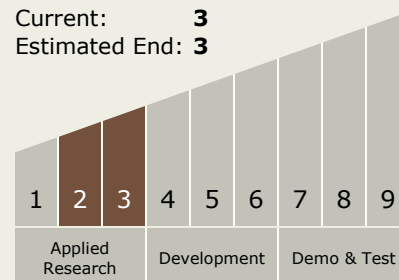
Carlos Torrez

Principal Investigator:

Alton J Reich

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System